sPHENIX Calorimeter Electronics

L2 Managers Meeting

E.J. Mannel

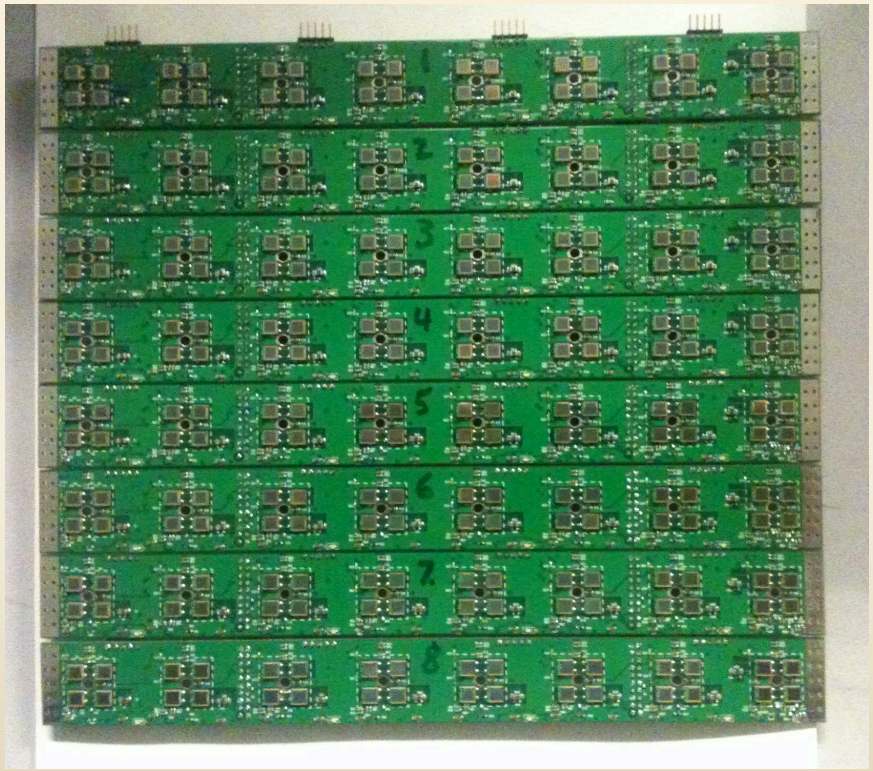
May 12, 2016

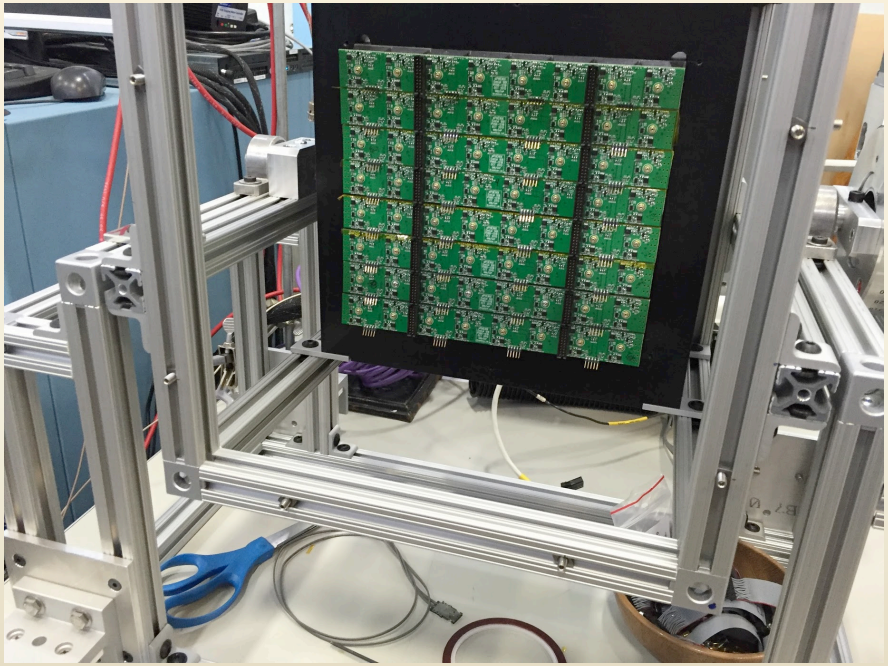
The Cast and Crew

- L2 Manager: E. Mannel
- L3 Managers:
  - SiPMs: S. Stoll
  - Frontend EMCal/Hcal Electronics: S. Boose
  - Digitizer Electronics: C. Chi
- Institutions:
  - Design and prototyping:
    - BNL
    - Nevis Labs, Columbia University
  - Testing and evaluation
    - BNL: EMCal/HCal
    - Colorado: HCal
    - Debrecen: SiPMs
    - Iowa State: Hcal
    - Georgia State University: HCal
    - Nevis Labs, Columbia Univ.
    - UIUC: EMCal
    - Univ. of Michigan: SiPMs

Recent Work

- Designed and fabricated EMCal (64 channel) and HCal (32 channel) frontend electronics with associated controllers.





Inner HCal Prototype

Controllers

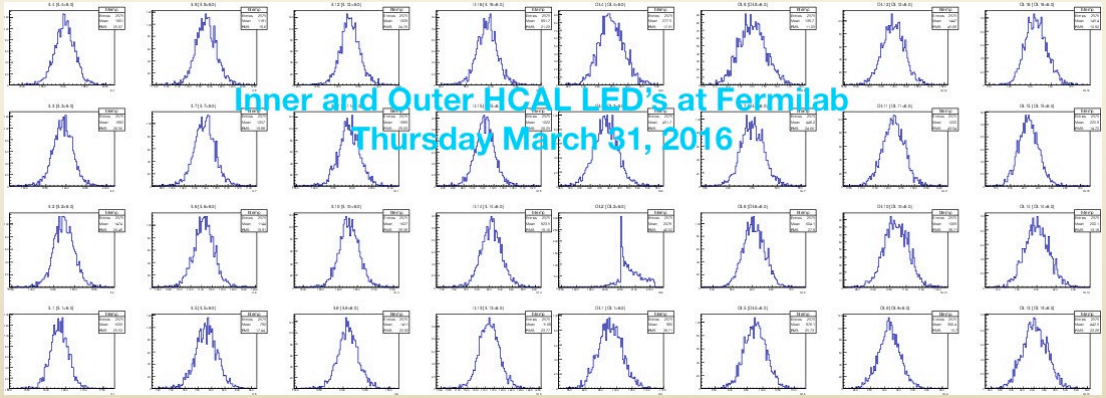
Similar controllers for EMCal/HCal
Provide temperature/leakage current monitoring
Bias voltage adjustment
LED Pulser control for testing

Electronics rack at test beam;
Digitizers, trigger electronics, controllers.

The Success Story

After ~900 miles on a truck:

And the effort of a number of sPHENIX Test Beam participants (BNL/ISU/GSU/UM/UIUC/WSU)

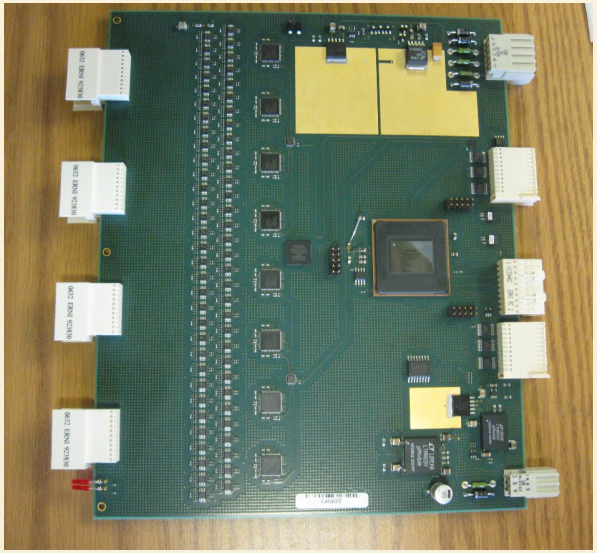


Photos and plots courtesy of J. Haggerty, J. Huang and S. Stoll

Digitizers

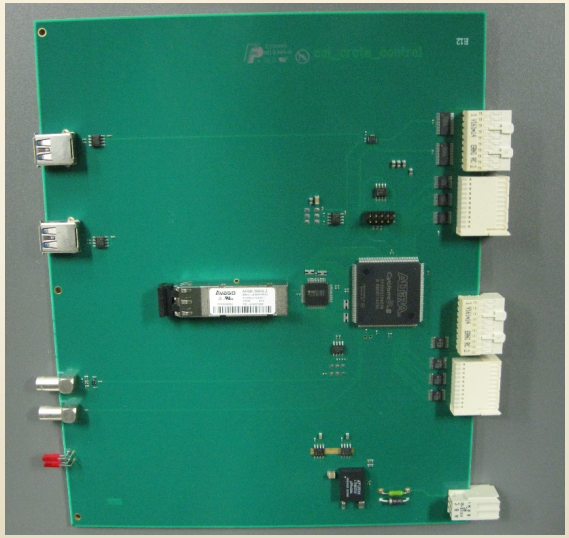
- Based on PHENIX Hadron Blind Detector (HBD) system
- Digitizer:
  - 64 channels per board
  - 14 bit ADC
  - 60 MHz sampling frequency
  - Capable of generating trigger primatives
- XMIT Module
  - Transmits data from multiple (4) Digitizers
  - 8/10 Bit encoding
  - Compatible with DCM-II
- Crate Controller
  - JSEB-2 interface for slow control and readback
  - Internal clock option

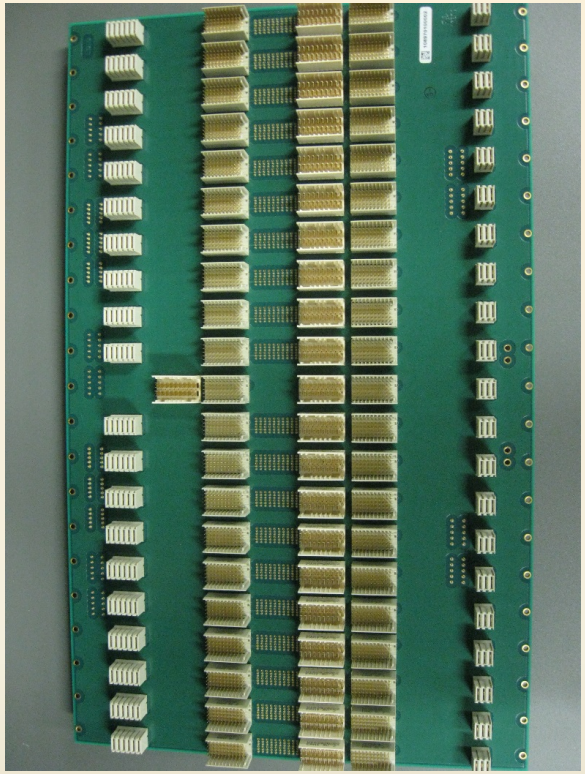
First Boards



ADC Board

Controller





Backplane-
Nevis Transport Bus

Pictures from C. Chi

Digitizer Status

- Current status @ Nevis
  - 3 ADC boards functional
  - 1 Controller board works
  - 1 XMIT board is under going tests, XMIT->DCM-II link functional
  - Working on preparing a BNL Test Stand
- Near term plans
  - Understand noise issues with alternate power supplies
  - Setup test stand for transfer to BNL- Target date July 2016
    - Crate
    - Controller
    - ADC module
    - XMIT module
    - Software and documentation ala Chi with input from S. Campbell

The Near Future (May 2016-Feb 2017)

- Irregular bi-weekly meetings on Wednesday's at 1330
- Evaluate electronics performance in test beam
  - First meeting, 11-May-2016
- Evaluate digitizer prototype
  - May-August
- Specify design changes necessary for next test beam effort
  - May to July
- Implement and test design changes
  - July to November
- Setup test beam electronics
  - November to December
  - Includes full chain through new 64 channel digitizers and DCM-II
- Test beam participation
  - January-February